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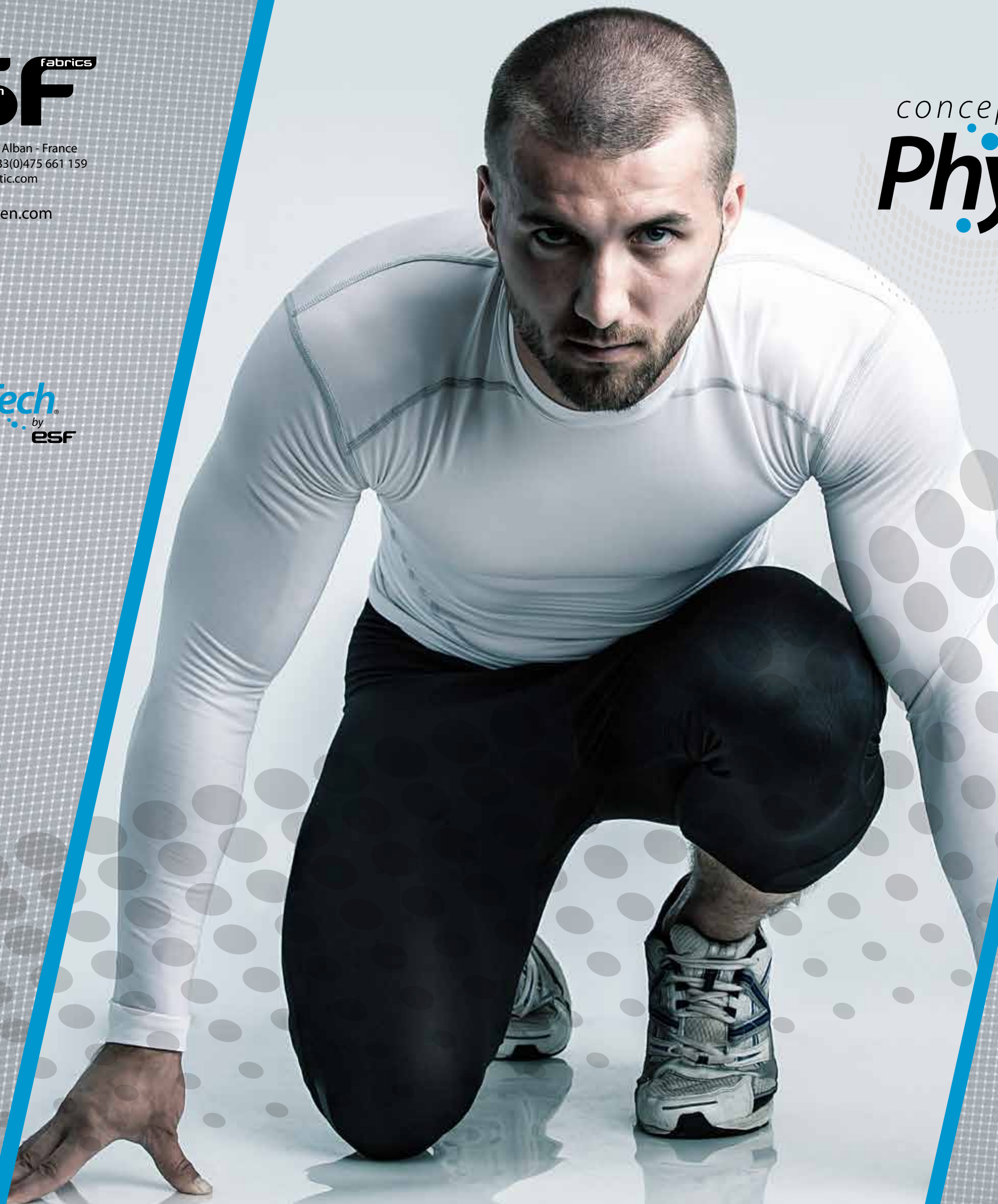
07000 Saint Julien en Saint Alban - France
Tel. 33 (0)475 661 150 - Fax : 33(0)475 661 159
Email : esflv@pagastic.com

www.groupepayen.com

concept
PhysioTech
by
ESF

concept
PhysioTech[®]
by
ESF

AQUATECH[®] compression fabrics, made using the PhysioTech[®] concept, enhance physiological performance during physical activity, and shorten the subsequent recovery phase, according to a study conducted by the BIOLOGICAL MEDICINE ANALYSIS PATRICK LEON LABORATORY (Controlled by BIOMNIS LABORATORY in Paris), and validated by Dr Alain ASTIÉ, a leading expert in sports biology.



Protocol

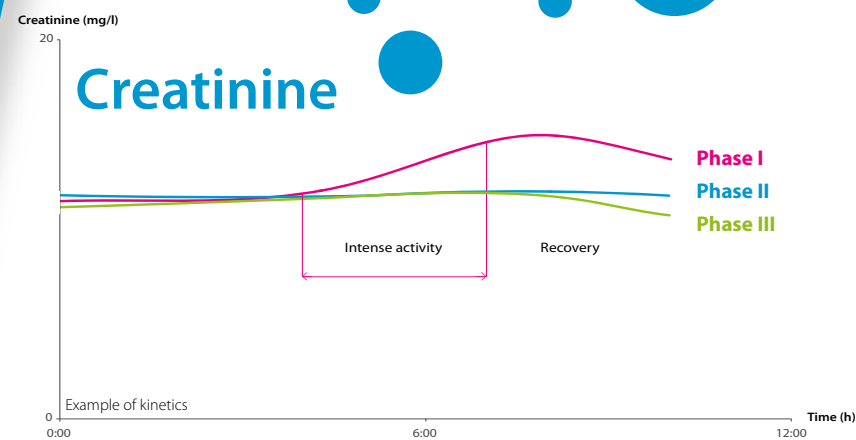
Athletes were subjected to standardized, intensive exercises over a period of six months. Biological and clinical surveys, including three days of blood samples, were conducted during this period, leading to a precise kinetics of various biological parameters and objective interpretation.

The test protocol was carried out in three phases to measure the impact of Physiotech®:

- Phase I** Effort and recovery without compression
- Phase II** Effort with Physiotech®, recovery without compression
- Phase III** Effort and recovery, both with Physiotech®

3 essential biological parameters were measured in this study: **Creatine phosphokinase (CPK), Creatinine and Potassium K+**:

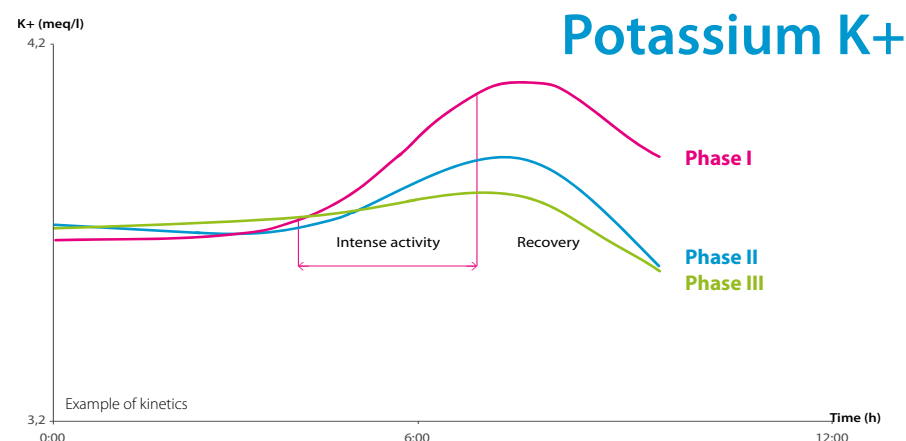
- CPK and Creatinine, markers of muscle metabolism, are tracked during exercise and during recovery to detect myopathy and particularly myolysis in athletes.
- Potassium (K+) is an electrolyte cell.



Creatinine, a molecule for the production of energy in form of adenosine triphosphate (ATP), is a breakdown product of creatine phosphate in the muscles. Creatine degrades spontaneously in our muscle cells and its degradation product is creatinine. It is transported by the blood and then excreted by the kidney and in the urine. **The measurement of creatinine (creatininaemia)**

provides information on renal filtration capacity and muscle mass.

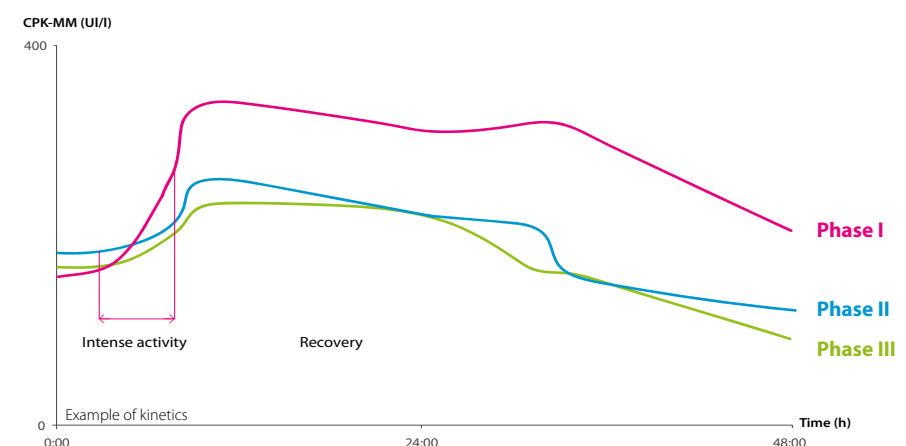
Athletes have higher creatinine levels because their muscles work harder and thus produce more. This level increases in case of renal insufficiency and intense physical activity. **Creatinine is an indicator of myolysis in case of intense sports activity.**



Potassium K+ is an essentially intracellular ion in the body. In normal situations it is provided by food and its blood level is regulated by the kidney. Potassium ion exchanges between the intracellular and extracellular environments **impact the propagation of nerve impulses and the contracti-**

lity of muscle fibres (both joint muscles and heart muscle). Potassium K+ also regulates the water exchange across cell membranes, preventing the leakage of cellular fluids outwards. **During intense sport activities potassium K+ is released into the blood.**

Creatine phosphokinase (CPK) or creatine kinase (CK)



Creatine Phosphokinase (CPK) or Creatine Kinase (CK), is an enzyme used exclusively by muscle cells to allow operation of the muscles. **This protein is needed for muscle cells to achieve various chemical reactions.** The concentration of CPK is

usually low in the blood. **An increase in concentration is indicative of a destruction of muscle cells (myolysis) during intense physical effort.**

Myolysis releases muscle protein into the bloodstream which results in contractures and muscle aches.

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Results

Biological by ESF

Clinical by ESF

Using Physiotech® during exercise, but not during recovery (Phase II) limits the rise in biological markers and myolysis:

- The level of **Creatinine** is increased to approximately 5%, compared to 30% on average without using Physiotech®.
- The recovery period is reduced to a maximum of 10 hours**, compared to 24 hours on average.
- The **K+** level **increased (2-5%) using Physiotech®**, compared to 10% on average.
- **CPK levels stabilize at a maximum of 20% using Physiotech®**, compared with 40% on average, with a **return to normal between 24 and 36 hours**, compared to 48 hours on average.

Using Physiotech® during both exercise and recovery (Phase III) has the best physiological gains:

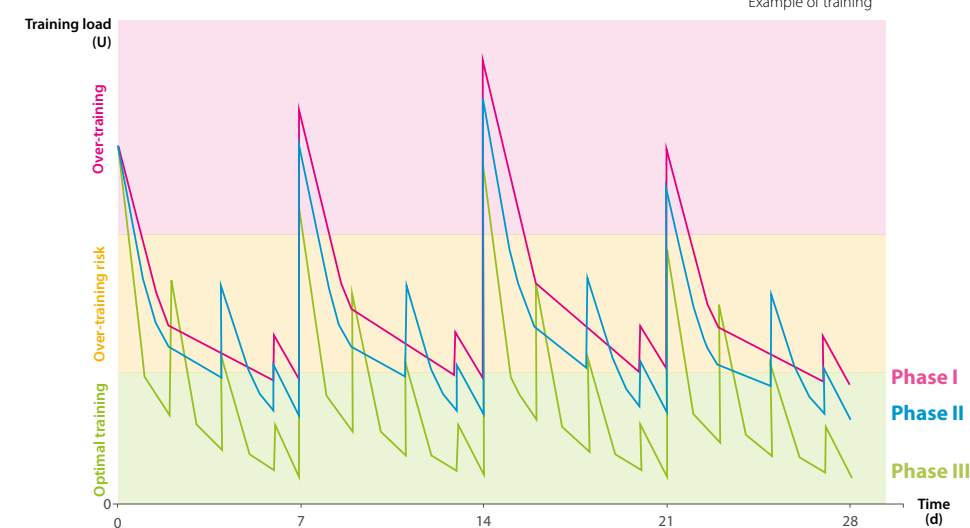
- The **Creatinine** level is **increased by 5% on average**, with a **return to normal is less than 5 hours**
- **K+** level remains relatively **stable** during exercise.
- **CPK level increases by a maximum 20%** during activity, with a **return to normal level sharply decreased in less than 24 hours.**

- **An optimisation of recovery and training load**
- **Lack of muscle heaviness and stiffness**
- **Delay in lactic acid rise**
- **Important decrease of cramp**
- **A real gain in endurance and explosiveness**
- **Injury Prevention**

Thanks to targeted muscle compression, the **Physiotech® Concept has demonstrated effectiveness:**

- Our **new range of AQUATECH® fabrics with progressive compression and constant elasticity** activates blood flow to more quickly eliminate metabolic wastes accumulated during intense physical activity.
- Our **AQUATECH® fabrics provide muscle support for symmetric or asymmetric compression**, depending on the compressed regions, avoiding any sloshing of the muscle masses to reduce the chance of myolysis (increased CPK).
- Our **AQUATECH® fabrics insure dynamic comfort and allow freedom in multidirectional movements.**

Training load



Conclusion

“Gains from the use of these new compression fabrics during exercise and recovery was quantified through targeted protocols. Correlative studies on myolysis and muscle regeneration have shown gains up to 25% of muscle cytolysis and 24 to 36h in the recovery phase. For all athletes, it is a significant advantage in performance and injury prevention. Today AQUATECH® represents a major scientific progress”

Dr Alain Astié

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